

# Physics 222 Lab Syllabus

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## Overview

Physics 222: *General Physics Laboratory II* is a one credit-hour laboratory course that meets once weekly for two hours and fifty minutes at a time. Content covered includes mechanics, electromagnetism, and optics.

This syllabus is subject to change; any changes will be approved by a lab manager and announced by lab instructors.

## Prerequisites

Physics 222 requires either completion or parallel enrollment in Physics 212.

## Course Objectives

Of the course of the semester, Physics 222 lab will

- Strengthen your understanding of and intuition for basic physics concepts in measurements, mechanics, electric fields, circuits, magnetism, and optics.
- Develop your ability to collect, analyze, and formulate meaningful conclusions about data.
- Enhance your ability to communicate results and ideas through scientific writing as well as graphical and functional representations of data.
- Introduce you to various computer-based tools for studying in the sciences.
- Practice your skills at working cooperatively within a team to achieve solutions to given problems.
- Give you experience at relating physics concepts to real-world applications.

## Required Materials

Students will need access to the internet and Canvas. They will also need access to a word processor, such as Microsoft Word or Google Docs, and a spreadsheet program, such as Microsoft Excel or Google Sheets.

## Attendance and Makeups

Attendance at all laboratory meetings is mandatory. If a student misses a lab, they must receive permission from the instructor or lab manager to schedule a makeup, and the makeup must occur during the same or following week as the absence. Students who are unable to schedule a makeup must discuss the situation with their instructor as soon as they are able. Documentation is required for excused absences.

If a student makes up the lab the week of the absence, then they will work and share a grade from another section's group. However, if they attend the following week, they are responsible for finishing the lab and writing their own report alone.

## Pre-Lab Assignments

Students will need to complete the pre-lab assignment on Canvas each week before coming to lab. The Pre-Lab Assignment will be available each week on Thursday morning and will be due by the end of the day on Tuesday. This will consist of questions about material covered in the previous week, material and concepts in the lab manual for the coming week, and potentially information included in this syllabus.

## Lab Reports

Experimental logbooks are a crucial component of all technical and scientific work. Students will be required to complete and turn in a lab report each week, covering the procedures outlined in the lab manual. Lab reports will be done digitally using a word processor such as Microsoft Word or Google Docs. All lab reports will be turned in online via Canvas. Lab reports are group assignments and are due by the end of lab.

*Absolutely no late work will be accepted.*

## Lab Practical

The final week of lab will have a one-hour lab practical to assess the experimental techniques and concepts learned throughout the semester. Each student will rotate between five tables, having ten minutes for four simpler experiments and twenty minutes for a slightly more complicated experiment. More details for this will be revealed towards the end of the semester.

## Working in Groups

Having experience successfully working in teams is highly valued by employers in all career fields. Students who come to class will work with up to two lab partners, assigned by the instructor, to complete their tasks and write their reports. New lab partners will be assigned periodically. Lab instructors reserve the right to reassign lab partners at any time for any reason.

Each group will submit one lab report per lesson. All group members should agree to the contents of the lab report before it is submitted for the week. Lab instructors reserve the right to penalize any individual student's grade if that student is not sufficiently participating in lab procedures or contributing to the report. If you feel a member of your group is not contributing, then please contact your TA.

## Student Expectations

Lab procedures often rely on equipment that is expensive to replace or irreplaceable, and that is meant to be used by hundreds of students each semester. Students are expected to treat the lab equipment with extreme care. Broken or malfunctioning equipment must be reported to the instructor immediately. When lab is over, students are required to clean up their lab station and neatly arrange the equipment before leaving. For

students in the last lab of the day, this includes powering down the computer and monitor at their lab station.

Using lab reports from other student's work from previous or current semesters is not allowed! Any student caught copying or referencing a report that is not theirs will receive a zero for that lesson and be reported to the lab manager, department chair, and the university administration. The student may incur additional penalties in accordance with university policy. All reports will be cross-referenced with other reports via Turnitin to ensure academic integrity.

Students are expected to maintain a positive educational environment as outlined in the Student Code of Conduct. Violations of the Code will be reported to the University administration.

## Grading

Each lab report is worth 100 total points. These points are broken down into the categories described below. For each category, points will be awarded in whole point increments. For example, a report could receive a completeness score of 13 or 14 out of 15, but not 13.5 out of 15.

***Formatting/Layout*** (15 points) The lab report is written legibly and is well organized following the guidelines given in the lab syllabus. Questions are labeled with the numbers/letters provided in the lab manual and are answered with complete sentences. Data is organized in tables. All tables and graphs include a title, labels, and units.

***Completeness*** (15 points) All tasks have been completed and all questions have been answered. All relevant data, graphs, and calculations have been included in the lab report. If there are many groups that cannot finish any given lab, this will be considered by the instructor when grading.

***Data/Results*** (30 points) The data provided is relevant to the current experiment. All data is taken in a manner to reduce noise/outliers and maximize accuracy and repeatability. This may require taking multiple data runs and/or adjusting alignments or sample rates for equipment. Graphs are used when appropriate. All graphs are scaled appropriately and are easy to read and interpret. Trend lines and equations are included when necessary. Data analysis is consistent with all data included in the report and all physics equations relevant to the lab.

***Physics Concepts/Understanding*** (20 points) The report shows a strong understanding of the physics concepts involved and the procedures and techniques that were carried out. Statements are backed up by evidence, including references to information from the lab manual or experimental results when relevant.

***Accuracy and Implications*** (20 points) The Accuracy and Implications sections have been completed using full sentences. Each section is 4 sentences or longer. Each section has been completed meeting the criteria given in the Writing a Lab Report section.

Questions about a score given for a lab report or pre-lab assignment can be discussed with the lab instructor. Discuss concerns privately with the lab instructor at the end of lab or at a time outside of lab. If you feel a score is inappropriate, you should explain why, in writing, and give this written explanation to your lab instructor within one week of when you received the score. Scores will not be reconsidered after the one-week time has passed.

Final lab scores will be based on the average scores of lab reports (75%), pre-lab assignments (10%), and the lab practical (15%). If a lab or pre-lab assignment is missed and neither made up nor excused, it will be graded as a zero. To maintain uniformity across sections with different instructors, lab managers will scale grades for all students in specific lab sections. No grades will be scaled down. The lowest lab report and the lowest prelab assignment grades will not be dropped.